Introduction to the High School Arkansas Mathematics Standards

When charged with the task of revising the previous mathematics standards, a group of qualified individuals from across the state came together to craft standards that were specific for the schools and students of Arkansas. The result of this work, the Arkansas Mathematics Standards, is contained in this document. These standards reflect what educators across our state know to be best for our students.

These standards retain the same structure as the previous standards in terms of organization. The standards are organized by domains, clusters, and standards. Domains represent the big ideas that are to be studied at each grade level and sometimes across grade bands. These big ideas support educators in determining the proper amount of focus and instructional time to be given to each of these topics.
Clusters represent collections of standards that are grouped together to help educators understand the building blocks of rich and meaningful instructional units. These units help students make connections within clusters and avoid seeing mathematics as a discreet list of skills that they must master. Standards represent the foundational building blocks of math instruction. The standards outlined in this document work together to ensure that students are college and career ready and on track for success.

There are additional similarities shared by these new standards and the previous standards. The main similarity is the structure of the nomenclature. The only change that was made to the naming system was intended to reflect that these standards belong to Arkansas. However, educators may still search for open education resources by using the last part of the label, which will link to the resources for the previous standards. New standards can be found at the end of each cluster in which a new standard was deemed necessary.

Another similarity to the previous standards is the use of the symbols (+) and (*) to distinguish certain standards from others. The plus (+) symbol is used to designate standards that are typically beyond the scope of an Algebra II course. However, some of the plus (+) standards are now included in courses that are not considered to be beyond Algebra II. Standards denoted with the asterisk (*) symbol represent the modeling component of the standards. These standards should be presented in a modeling context where students are required to engage in the modeling process that is outlined in the Standards for Mathematical Practice.

The revision committee opted to include some new elements in the Arkansas Mathematics Standards that represent an attempt at greater clarity and more consistent implementation across the state. Many of the revisions are a rewording of the original Common Core State Standards. The purpose of the rewording is often to help educators better understand the areas of emphasis and focus within the existing standard. Likewise, many of the standards are separated into a bulleted list of content. This does not mean that teachers should treat this content as a checklist of items that they must teach one at a time. The content was bulleted out so that teachers can better understand all that is included in some of the broader standards. Many of the examples that were included in the original standards were either changed for clarity or separated from the body of the actual standard. The committee wanted educators to understand that the examples included in the body of the standards document in no

way reflect all of the possible examples. Likewise, these examples do not mandate curriculum or problem types. Local districts are free to select the curriculum and instructional methods they think best for their students.

In some instances, notes of clarification were added. These notes were intended to clarify, for teachers, what the expectations are for the student. Likewise, these notes provide instructional guidance as well as limitations so that teachers can better understand the scope of the standard. This will help the educators in determining what is developmentally appropriate for students when they are working with certain standards.

Finally, the Arkansas Mathematics Standards will become a living document. The staff of the Arkansas Department of Education hopes that this document portrays the hard work of the Arkansas educators who took part in the revision process and that it represents an improvement to the previous set of standards. As these standards are implemented across schools in the state, the Arkansas Department of Education welcomes further suggestions related to notes of clarification, examples, professional development needs, and future revisions of the standards.

High School Number and Quantity – Arkansas Mathematics Standards

The Real Number System	**Extend the properties of exponents to rational exponents**
AR.Math.Content.HSN.RN.A.1	Explain how extending the properties of integer exponents to rational exponents provides an alternative notation for radicals. *For example: We define $5^{4/3}$ to be the cube root of 5^4 because we want $(5^{4/3})^{3/4} = 5$ to hold.*
AR.Math.Content.HSN.RN.A.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents.

The Real Number System	**Use properties of rational and irrational numbers**
AR.Math.Content.HSN.RN.B.3	Explain why • The sum/difference or product/quotient (where defined) of two rational numbers is rational; • The sum/difference of a rational number and an irrational number is irrational; • The product/quotient of a nonzero rational number and an irrational number is irrational; and • The product/quotient of two nonzero rationals is a nonzero rational.
AR.Math.Content.HSN.RN.B.4	• Simplify radical expressions • Perform operations (add, subtract, multiply, and divide) with radical expressions • Rationalize denominators and/or numerators

High School Number and Quantity – Arkansas Mathematics Standards

Quantities	**Reason quantitatively and use units to solve problems**
AR.Math.Content.HSN.Q.A.1	• Use units as a way to understand problems and to guide the solution of multi-step problems. • Choose and interpret units consistently in formulas. • Choose and interpret the scale and the origin in graphs and data displays.
AR.Math.Content.HSN.Q.A.2	Define appropriate quantities for the purpose of descriptive modeling. (I.E., Use units appropriate to the problem being solved.)
AR.Math.Content.HSN.Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

High School Number and Quantity – Arkansas Mathematics Standards

The Complex Number System	Perform arithmetic operations with complex numbers
AR.Math.Content.HSN.CN.A.1	Know there is a complex number *i* such that $i^2 = -1$, and every complex number has the form $a + bi$ with *a* and *b* real.
AR.Math.Content.HSN.CN.A.2	Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.
AR.Math.Content.HSN.CN.A.3	• Find the conjugate of a complex number. • Use conjugates to find quotients of complex numbers. • (+)Use conjugates to find moduli.

The Complex Number System	Represent complex numbers and their operations on the complex plane
AR.Math.Content.HSN.CN.B.4	• (+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers) • (+) Explain why the rectangular and polar forms of a given complex number represent the same number.
AR.Math.Content.HSN.CN.B.5	• (+) Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; • (+) Use properties of geometrical representation for computation. *For example: $(-1 + iv3)^3 = 8$ because (-1 + v3 i) has modulus 2 and argument 120°.*
AR.Math.Content.HSN.CN.B.6	(+) Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.

The Complex Number System	Use complex numbers in polynomial identities and equations
AR.Math.Content.HSN.CN.C.7	Solve quadratic equations with real coefficients that have real or complex solutions.
AR.Math.Content.HSN.CN.C.8	(+) Extend polynomial identities to the complex numbers. *For example: Rewrite $x^2 + 4$ as $(x + 2i)(x - 2i)$.*
AR.Math.Content.HSN.CN.C.9	• (+) Know the Fundamental Theorem of Algebra • (+) Show that it is true for quadratic polynomials.

Vector and Matrix Quantities	**Represent and model with vector quantities**
AR.Math.Content.HSN.VM.A.1	• (+) Recognize vector quantities as having both magnitude and direction. • (+) Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., $\boldsymbol{v}$, $\lvert\boldsymbol{v}\rvert$, $\lvert\lvert\boldsymbol{v}\rvert\rvert$, v).
AR.Math.Content.HSN.VM.A.2	(+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.
AR.Math.Content.HSN.VM.A.3	(+) Solve problems involving velocity and other quantities that can be represented by vectors.

Vector and Matrix Quantities	**Perform operations on vectors**
AR.Math.Content.HSN.VM.B.4	(+) Add and subtract vectors. • Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes. • Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum. • Understand vector subtraction $\boldsymbol{v} - \boldsymbol{w}$ as $\boldsymbol{v} + (-\boldsymbol{w})$, where $-\boldsymbol{w}$ is the additive inverse of $\boldsymbol{w}$, with the same magnitude as $\boldsymbol{w}$ and pointing in the opposite direction. • Represent vector subtraction graphically by connecting the tips in the appropriate order • Perform vector subtraction component-wise.
AR.Math.Content.HSN.VM.B.5	(+) Multiply a vector by a scalar. • Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; • Perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$. • Compute the magnitude of a scalar multiple $c\boldsymbol{v}$ using $\lvert\lvert c\boldsymbol{v}\rvert\rvert = \lvert c\rvert\boldsymbol{v}$. • Compute the direction of $c\boldsymbol{v}$ knowing that when $\lvert c\rvert\boldsymbol{v} \neq 0$, the direction of $c\boldsymbol{v}$ is either along $\boldsymbol{v}$ (for $c > 0$) or against $\boldsymbol{v}$ (for $c < 0$).

High School Number and Quantity – Arkansas Mathematics Standards

Vector and Matrix Quantities	Perform operations on matrices and use matrices in applications
AR.Math.Content.HSN.VM.C.6	(+) Use matrices to represent and manipulate data (e.g., to represent payoffs or incidence relationships in a network).
AR.Math.Content.HSN.VM.C.7	(+) Multiply matrices by scalars to produce new matrices (e.g., as when all of the payoffs in a game are doubled).
AR.Math.Content.HSN.VM.C.8	(+) Add, subtract, and multiply matrices of appropriate dimensions.
AR.Math.Content.HSN.VM.C.9	(+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.
AR.Math.Content.HSN.VM.C.10	Understand that: • (+) The zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. • (+)The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.
AR.Math.Content.HSN.VM.C.11	• (+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. • (+)Work with matrices as transformations of vectors.
AR.Math.Content.HSN.VM.C.12	(+) Work with 2 × 2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area.

High School Algebra – Arkansas Mathematics Standards

Seeing Structure in Expressions	**Interpret the structure of expressions.**
AR.Math.Content.HSA.SSE.A.1	Interpret expressions that represent a quantity in terms of its context.* • Interpret parts of an expression using appropriate vocabulary, such as terms, factors, and coefficients. • Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example: Interpret* $P(1 \pm r)^n$ *as the product of P and a factor not depending on P.*
AR.Math.Content.HSA.SSE.A.2	Use the structure of an expression to identify ways to rewrite it. *For example: See that (x + 3)(x + 3) is the same as $(x + 3)^2$ OR $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.*

Seeing Structure in Expressions	**Write expressions in equivalent forms to solve problems.**
AR.Math.Content.HSA.SSE.B.3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.* • Factor a quadratic expression to reveal the zeros of the function it defines. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. Note: Students should be able to identify and use various forms of a quadratic expression to solve problems. o Standard Form: $ax + bx + c$ o Factored Form: $a(x - r_1)(x - r_2)$ o Vertex Form: $a\ (x - h\ ) + k$ • Use the properties of exponents to transform expressions for exponential functions. *For example: The expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.*

High School Algebra – Arkansas Mathematics Standards

AR.Math.Content.HSA.SSE.B.4	Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. *For example: Calculate mortgage payments.*

High School Algebra – Arkansas Mathematics Standards

Arithmetic with Polynomials and Rational Expressions	**Perform arithmetic operations on polynomials.**
AR.Math.Content.HSA.APR.A.1	• Add, subtract, and multiply polynomials • Understand that polynomials, like the integers, are **closed** under addition, subtraction, and multiplication Note: If p and q are polynomials p + q, p – q, and pq are also polynomials

Arithmetic with Polynomials and Rational Expressions	**Understand the relationship between zeros and factors of polynomials.**
AR.Math.Content.HSA.APR.B.2	Know and apply the Factor and Remainder Theorems: For a polynomial $p(x)$ and a number a, the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.
AR.Math.Content.HSA.APR.B.3	• Identify zeros of polynomials when suitable factorizations are available • Use the zeros to construct a rough graph of the function defined by the polynomial. Note: Algebra I is limited to the use of quadratics.

Arithmetic with Polynomials and Rational Expressions	**Use polynomial identities to solve problems.**
AR.Math.Content.HSA.APR.C.4	Prove polynomial identities and use them to describe numerical relationships. *Note: Examples of Polynomial Identities may include but are not limited to the following:* • $(a + b)^2 = a^2 + 2ab + b^2$ *(Algebra 1)* • $a^2 – b^2 = (a – b)(a + b)$ *(Algebra 1)* • $(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$ *can be used to generate Pythagorean triples (Algebra 2).*
AR.Math.Content.HSA.APR.C.5	(+) Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle. Note: The Binomial Theorem can be proved by mathematical induction or by a combinatorial argument.

Arithmetic with Polynomials and Rational Expressions	**Rewrite rational expressions.**
AR.Math.Content.HSA.APR.D.6	Rewrite simple rational expressions in different forms; write $^{a(x)}/_{b(x)}$ in the form $q(x) + {}^{r(x)}/_{b(x)}$, (where $a(x)$ is the dividend, $b(x)$ is the divisor, $q(x)$ is the quotient, and $r(x)$ is the remainder) are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system. *For example:* $\frac{3x^3-5x^2+10x-3}{3x+1} = x^2-2x+4+\frac{-7}{3x+1}$ Note: Students should understand that this method of dividing polynomials can be used for any polynomial expression, but that synthetic division should only be used when the divisor is a first-degree polynomial. Students should also recognize that when using synthetic division with a first-degree polynomial divisor that has a leading coefficient other than one, (such as $3x + 1$, where $x = -1/3$ is the "synthetic divisor" as in the example above), that the denominator of the "synthetic divisor" must be factored out of the quotient and multiplied by the divisor after the synthetic division has taken place.
AR.Math.Content.HSA.APR.D.7	• Add, subtract, multiply, and divide by nonzero rational expressions • Understand that rational expressions, like the integers, are closed under addition, subtraction, and multiplication

High School Algebra – Arkansas Mathematics Standards

Creating Equations	**Create equations that describe numbers or relationships.**
AR.Math.Content.HSA.CED.A.1	Create equations and inequalities in one variable and use them to solve problems. Note: *Including but not limited to equations arising from:* • *Linear functions* • *Quadratic functions* • *Simple rational functions* • *Exponential functions* • *Absolute value functions*
AR.Math.Content.HSA.CED.A.2	• Create equations in two or more variables to represent relationships between quantities • Graph equations, in two variables, on a coordinate plane.
AR.Math.Content.HSA.CED.A.3	• Represent and interpret constraints by equations or inequalities, and by systems of equations and/or inequalities. • Interpret solutions as viable or nonviable options in a modeling and/or real-world context.
AR.Math.Content.HSA.CED.A.4	Rearrange literal equations using the properties of equality

Modeling Standards: Modeling is best interpreted not as a collection of isolated topics but rather in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appears throughout the high school standards indicated by a star symbol (*).

High School Algebra – Arkansas Mathematics Standards

Reasoning with Equations and Inequalities	**Understand solving equations as a process of reasoning and explain the reasoning.**
AR.Math.Content.HSA.REI.A.1	Assuming that equations have a solution, construct a solution and justify the reasoning used. Note: Students are not required to use only one procedure to solve problems nor are they required to show each step of the process. Students should be able to justify their solution in their own words.
AR.Math.Content.HSA.REI.A.2	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. *For example: The area of a square equals 49 square inches. The length of the side is 7 inches. Although -7 is a solution to the equation, $x^2 = 49$, -7 is an extraneous solution.*

Reasoning with Equations and Inequalities	**Solve equations and inequalities in one variable.**
AR.Math.Content.HSA.REI.B.3	Solve linear equations, inequalities and absolute value equations in one variable, including equations with coefficients represented by letters.
AR.Math.Content.HSA.REI.B.4	Solve quadratic equations in one variable. • Use the method of completing the square to transform any quadratic equation in *x* into an equation of the form $(x - p)^2 = q$ that has the same solutions. Note: This would be a good opportunity to demonstrate/explore how the quadratic formula is derived. This standard also connects to the transformations of functions and identifying key features of a graph (F-BF3). Introduce this with a leading coefficient of 1 in Algebra I. Finish mastery in Algebra II. • Solve quadratic equations (as appropriate to the initial form of the equation) by: o Inspection of a graph o Taking square roots o Completing the square o Using the quadratic formula o Factoring Recognize complex solutions and write them as $a \pm bi$ for real numbers a and b.

High School Algebra – Arkansas Mathematics Standards

Reasoning with Equations and Inequalities	**Solve systems of equations and inequalities graphically.**
AR.Math.Content.HSA.REI.C.5	• Solve systems of equations in two variables using substitution and elimination. • Understand that the solution to a system of equations will be the same when using substitution and elimination.
AR.Math.Content.HSA.REI.C.6	Solve systems of equations algebraically and graphically.
AR.Math.Content.HSA.REI.C.7	Solve systems of equations consisting of linear equations and nonlinear equations in two variables algebraically and graphically. *For example: Find the points of intersection between y = -3x and y = x^2 + 2.*
AR.Math.Content.HSA.REI.C.8	(+) Represent a system of linear equations as a single matrix equation in a vector variable.
AR.Math.Content.HSA.REI.C.9	(+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or greater).

Reasoning with Equations and Inequalities	**Solve systems of equations**
AR.Math.Content.HSA.REI.D.10	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane.

High School Algebra – Arkansas Mathematics Standards

AR.Math.Content.HSA.REI.D.11	Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; Find the solutions approximately by • Using technology to graph the functions (Algebra 1 and Algebra 2) • Making tables of values (Algebra 1 and Algebra 2) • Finding successive approximations (Algebra 1 and Algebra 2) Include cases (but not limited to) where $f(x)$ and/or $g(x)$ are • Linear (Algebra 1 and Algebra 2) • Polynomial (Algebra 1 and Algebra 2) • Rational (Algebra 2) • Absolute value (Algebra 1) • Exponential (Introduction in Algebra 1, Mastery in Algebra 2) • Logarithmic functions (Algebra 2) Teacher notes: Modeling should be applied throughout this standard.
AR.Math.Content.HSA.REI.D.12	Solve linear inequalities and systems of linear inequalities in two variables by graphing.

High School Functions – Arkansas Mathematics Standards

Interpreting Functions	**Understand the concept of a function and use function notation.**
AR.Math.Content.HSF.IF.A.1	• Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. • Understand that if *f* is a function and x is an element of its domain, then *f(x)* denotes the output of *f* corresponding to the input x. • Understand that the graph of f is the graph of the equation $y = (x)$.
AR.Math.Content.HSF.IF.A.2	In terms of a real-world context: • Use function notation, • Evaluate functions for inputs in their domains, and • Interpret statements that use function notation.
AR.Math.Content.HSF.IF.A.3	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. *For example: The Fibonacci sequence is defined recursively by* $f(0) = f(1) = 1, f(n+1) = f(n) + (n-1)$ *for* $n \geq 1$.

Interpreting Functions	**Interpret functions that arise in applications in terms of the context.**
AR.Math.Content.HSF.IF.B.4	For a function that models a relationship between two quantities: • Interpret key features of graphs and tables in terms of the quantities, and • Sketch graphs showing key features given a verbal description of the relationship. Note: Key features may include but not limited to: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*
AR.Math.Content.HSF.IF.B.5	• Relate the domain of a function to its graph. • Relate the domain of a function to the quantitative relationship it describes. *For example: If the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.**

AR.Math.Content.HSF.IF.B.6	• Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. * • Estimate the rate of change from a graph.*

Interpreting Functions	**Analyze functions using different representations.**
AR.Math.Content.HSF.IF.C.7	Graph functions expressed algebraically and show key features of the graph, with and without technology. • Graph linear and quadratic functions and, when applicable, show intercepts, maxima, and minima. • Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. • Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. • (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior. • Graph exponential and logarithmic functions, showing intercepts and end behavior. • (+) Graph trigonometric functions, showing period, midline, and amplitude.
AR.Math.Content.HSF.IF.C.8	Write expressions for functions in different but equivalent forms to reveal key features of the function. • Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values (vertex), and symmetry of the graph, and interpret these in terms of a context. Note: Connection to A.SSE.B.3b • Use the properties of exponents to interpret expressions for exponential functions. Note: Connection to A.SSE.B.3c Note: Various forms of exponentials might include representing the base as $1 \pm r$, where r is the rate of growth or decay.
AR.Math.Content.HSF.IF.C.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

High School Functions – Arkansas Mathematics Standards

Building Functions	**Build a function that models a relationship between two quantities.**
AR.Math.Content.HSF.BF.A.1	Write a function that describes a relationship between two quantities. * • From a context, determine an explicit expression, a recursive process, or steps for calculation. • Combine standard function types using arithmetic operations. *(e.g., given that f(x) and g(x) are functions developed from a context, find (f + g)(x), (f – g)(x), (fg)(x), (f/g)(x), and any combination thereof, given* $g\ (x) \neq 0$.*)* • Compose functions.
AR.Math.Content.HSF.BF.A.2	• Write arithmetic and geometric sequences both recursively and with an explicit formula, and translate between the two forms. • Use arithmetic and geometric sequences to model situations*

Building Functions	**Build new functions from existing functions.**
AR.Math.Content.HSF.BF.B.3	• Identify the effect on the graph of replacing $f(x)$ *by* $f(x) + k, k\,f(x), f(kx),$ and $f(x + k)$ for specific values of k (k, a constant both positive and negative); • Find the value of k given the graphs of the transformed functions. • Experiment with multiple transformations and illustrate an explanation of the effects on the graph with or without technology. *Include recognizing even and odd functions from their graphs and algebraic expressions for them.*
AR.Math.Content.HSF.BF.B.4	Find inverse functions. • Solve an equation of the form $y = f(x)$ for a simple function f that has an inverse and write an expression for the inverse. *For example,* $(x) = 2\,x^{!}$ *or* $f(x) = (x + 1)/(x - 1)$ *for* $x \neq 1$. • Verify by composition that one function is the inverse of another. (Algebra II) • Read values of an inverse function from a graph or a table, given that the function has an inverse. (Algebra II) • (+) Produce an invertible function from a non-invertible function by restricting the domain.
AR.Math.Content.HSF.BF.B.5	• Understand the inverse relationship between exponents and logarithms. • Use the inverse relationship between exponents and logarithms to solve problems.

High School Functions – Arkansas Mathematics Standards

Linear, Quadratic, and Exponential Models	**Construct and compare linear, quadratic, and exponential models and solve problems.**
AR.Math.Content.HSF.LE.A.1	Distinguish between situations that can be modeled with linear functions and with exponential functions. • Show that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. • Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. • Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.
AR.Math.Content.HSF.LE.A.2	Construct linear and exponential equations, including arithmetic and geometric sequences, • given a graph, • a description of a relationship, or • two input-output pairs (include reading these from a table).
AR.Math.Content.HSF.LE.A.3	Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or any polynomial function. Note: The study of polynomial functions, in general, is reserved for Algebra 2. This standard leads to discussions of relative rates of growth in further coursework.
AR.Math.Content.HSF.LE.A.4	• Express exponential models as logarithms • Express logarithmic models as exponentials • Use properties of logarithms to simplify and evaluate logarithmic expressions (expanding and/or condensing logarithms as appropriate) • Evaluate logarithms with or without technology Note: For exponential models, express the solution to $ab^{ct} = d$ where *a*, *c*, and *d* are constants and *b* is the base (Including, but not limited to: 2, 10, or *e*) as a logarithm; then evaluate the logarithm with or without technology. Connection to F.BF.B.5

High School Functions – Arkansas Mathematics Standards

Linear, Quadratic, and Exponential Models	**Interpret expressions for functions in terms of the situation they model.**
AR.Math.Content.HSF.BF.B.5	In terms of a context, interpret the parameters (rates of growth or decay, domain and range restrictions where applicable, etc.) in a function.

Trigonometric Functions	**Extend the domain of trigonometric functions using the unit circle.**
AR.Math.Content.HSF.TF.A.1	Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.
AR.Math.Content.HSF.TF.A.2	Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed around the unit circle.
AR.Math.Content.HSF.TF.A.3	• (+) Use special right triangles to determine geometrically the exact values of sine, cosine, tangent for $\frac{\pi}{3}, \frac{\pi}{4}, \frac{\pi}{6}$, and $\frac{\pi}{2}$ – • (+) Use the unit circle to express the values of sine, cosine, and tangent for $\pi - x, \pi + x$, and $2\pi - x$ in terms of their exact values for x, where x is any real number.
AR.Math.Content.HSF.TF.A.4	(+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.

Trigonometric Functions	**Model periodic phenomena with trigonometric functions.**
AR.Math.Content.HSF.TF.B.5	Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.*
AR.Math.Content.HSF.TF.B.6	(+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed. Note: Recognizing that the domain requires restriction because the function is not one-to-one, is acceptable for algebra 2. Whereas knowledge of how to restrict the domain and find the inverse is usually reserved for a fourth year mathematics course.
AR.Math.Content.HSF.TF.B.7	(+) Use inverse functions to: • Solve trigonometric equations that arise in modeling context(s)*; • Evaluate the solutions of trigonometric equations, with or without technology, and • Interpret the solutions of trigonometric equations in terms of the context(s).*

High School Functions – Arkansas Mathematics Standards

Trigonometric Functions	**Prove and apply trigonometric identities.**
AR.Math.Content.HSF.TF.C.8	• (+)Develop the Pythagorean identity, $\sin^2(\theta) + \cos^2(\theta) = 1$. • (+)Given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle, use the Pythagorean identity to find the remaining trigonometric functions.
AR.Math.Content.HSF.TF.C.9	(+) Develop the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.

High School Geometry – Arkansas Mathematics Standards

Congruence	**Investigate transformations in the plane**
AR.Math.Content.HSG.CO.A.1	Based on the undefined notions of point, line, plane, distance along a line, and distance around a circular arc, define: • Angle • Line segment • Circle • Perpendicular lines • Parallel lines
AR.Math.Content.HSG.CO.A.2	• Represent transformations in the plane (*e.g. using transparencies, tracing paper, geometry software, etc.).* • Describe transformations as functions that take points in the plane as inputs and give other points as outputs. • *Compare transformations that preserve distance and angle to those that do not. (*e.g., translation versus dilation).*
AR.Math.Content.HSG.CO.A.3	Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and/or reflections that carry it onto itself.
AR.Math.Content.HSG.CO.A.4	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
AR.Math.Content.HSG.CO.A.5	• Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure, (*e.g., using graph paper, tracing paper, miras, geometry software, etc.).* • Specify a sequence of transformations that will carry a given figure onto another.

Congruence	**Understand congruence in terms of rigid motions.**
AR.Math.Content.HSG.CO.B.6	• Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure • Given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.
AR.Math.Content.HSG.CO.B.7	Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.

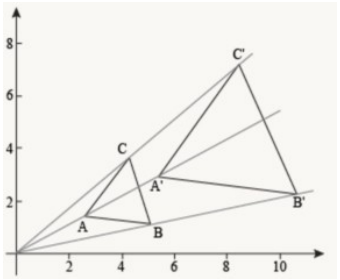
AR.Math.Content.HSG.CO.B.8	Investigate congruence in terms of rigid motion to develop the criteria for triangle congruence (ASA, SAS, AAS, SSS, and HL) *Note: The emphasis in this standard should be placed on investigation*

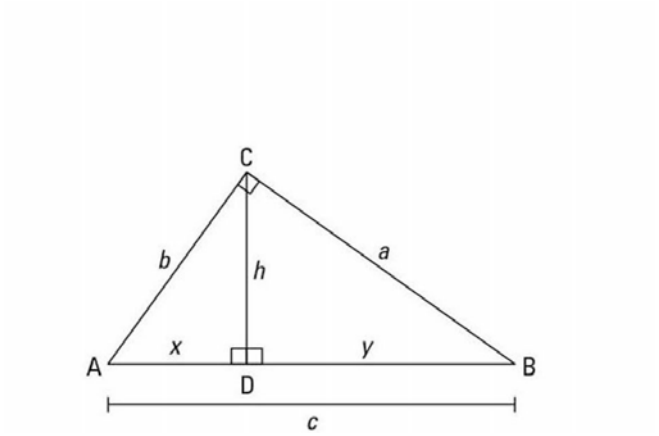
Congruence	**Apply and prove geometrictheorems.**
AR.Math.Content.HSG.CO.C.9	Apply and prove theorems about lines and angles. *Theorems include but are not limited to: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.* Note: Proofs are not an isolated topic and therefore should be integrated throughout the course.
AR.Math.Content.HSG.CO.C.10	Apply and prove theorems about triangles. *Theorems include but are not limited to: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.* Note: Proofs are not an isolated topic and therefore should be integrated throughout the course.
AR.Math.Content.HSG.CO.C.11	Apply and prove theorems about quadrilaterals. *Theorems include but are not limited to relationships among the sides, angles, and diagonals of quadrilaterals and the following theorems concerning parallelograms: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.* Note: Proofs are not an isolated topic and therefore should be integrated throughout the course.

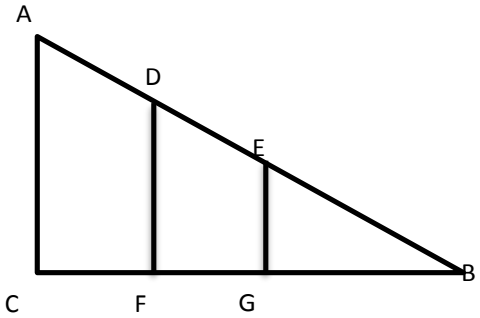
Congruence	**Make geometric constructions.**
AR.Math.Content.HSG.CO.D.12	Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Constructions may include but are not limited to: copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.* Note: Constructions are not an isolated topic and therefore should be integrated throughout the course.
AR.Math.Content.HSG.CO.D.13	Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle. Note: Constructions are not an isolated topic and therefore should be integrated throughout the course.

Congruence	**Logic and Reasoning.**
AR.Math.Content.HSG.CO.E.14	Apply inductive reasoning and deductive reasoning for making predictions based on real world situations using: • Conditional Statements (inverse, converse, and contrapositive) • Venn Diagrams Note: This is not intended to be an isolated topic but instead to support concepts throughout the course.

High School Geometry – Arkansas Mathematics Standards

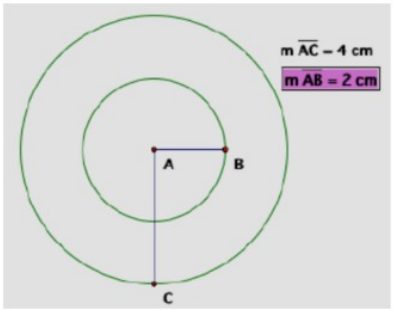
Similarity, Right Triangles, and Trigonometry	**Understand similarity in terms of similarity transformations.**
AR.Math.Content.HSG.SRT.A.1	Verify experimentally the properties of dilations given by a center and a scale factor. • A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. • The dilation of a line segment is longer or shorter in the ratio given by the scale factor.  http://www.shmoop.com/common-core-standards/ccss-hs-g-srt-1a.html
AR.Math.Content.HSG.SRT.A.2	Given two figures: • Use the definition of similarity in terms of similarity transformations to determine if they are similar • Explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.
AR.Math.Content.HSG.SRT.A.3	Use the properties of similarity transformations to establish the AA, SAS~, SSS~ criteria for two triangles to be similar.

Similarity, Right Triangles, and Trigonometry	**Apply and prove theorems involving similarity.**
AR.Math.Content.HSG.SRT.B.4	Use triangle similarity to apply and prove theorems about triangles. *Theorems include but are not limited to: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*  $\frac{x}{b}=\frac{b}{c}, \qquad \frac{y=c-x}{a}=\frac{a}{c}$ $x=\frac{b^2}{c}, \qquad c-x=\frac{a^2}{c}$ $x+(c-x)=c$ $\frac{a^2}{c}+\frac{b^2}{c}=c$ $a^2+b^2=c^2$
AR.Math.Content.HSG.SRT.B.5	• Use congruence (SSS, SAS, ASA, AAS, and HL) and similarity (AA, SSS~, SAS~) criteria for triangles to solve problems • Use congruence and similarity criteria to prove relationships in geometric figures.

Similarity, Right Triangles, and Trigonometry	**Define trigonometric ratios and solve problems involving right triangles.**
AR.Math.Content.HSG.SRT.C.6	Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles. *For example: Trigonometric ratios are related to the acute angles of a triangle, not the right angle. The values of the trigonometric ratio depend only on the angle. Consider the following three similar triangles (why are they similar)?* 
AR.Math.Content.HSG.SRT.C.7	Explain and use the relationship between the sine and cosine of complementary angles.
AR.Math.Content.HSG.SRT.C.8	Use trigonometric ratios, special right triangles, and/or the Pythagorean Theorem to find unknown measurements of right triangles in applied problems.* Note: Examples should Including, but are not limited to angles of elevation, angles of depression, navigation, and surveying.

Similarity, Right Triangles, and Trigonometry	**Apply trigonometry to general triangles.**
AR.Math.Content.HSG.SRT.D.9	(+) Derive the formula A = 1/2 ab sin(C) for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.
AR.Math.Content.HSG.SRT.D.10	(+) Prove the Laws of Sines and Cosines and use them to solve problems.
AR.Math.Content.HSG.SRT.D.11	(+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles Note: Examples should include, but are not limited to surveying problems and problems related to resultant forces.

High School Geometry – Arkansas Mathematics Standards

Circles	Understand and apply theorems about circles.
AR.Math.Content.HSG.C.A.1	Prove that all circles are similar.  http://www.azed.gov/azcommoncore/files/2012/11/high- school-ccss-flip-book-usd-259-2012.pdf
AR.Math.Content.HSG.C.A.2	Identify, describe, and use relationships among angles, radii, segments, lines, arcs, and chords as related to circles. Note: Examples include but are not limited to the following: the relationship between central, inscribed, and circumscribed angles and their intercepted arcs; angles inscribed in a semi-circle are right angles; the radius of a circle is perpendicular to a tangent line of the circle at the point of tangency.
AR.Math.Content.HSG.C.A.3	• Construct the inscribed and circumscribed circles of a triangle. • Prove properties of angles for a quadrilateral inscribed in a circle.
AR.Math.Content.HSG.C.A.4	Deleted Standard

Circles	Find arc lengths and areas of sectors of circles.
AR.Math.Content.HSG.C.B.5	• Derive using similarity that the length of the arc intercepted by an angle is proportional to the radius. • Derive and use the formula for the area of a sector. • Understand the radian measure of the angle as a unit of measure. Note: Connected to F.TF.1 (+)

High School Geometry – Arkansas Mathematics Standards

Expressing Geometric Properties with Equations	**Translate between the geometric description and the equation for a conic section.**
AR.Math.Content.HSG.GPE.A.1	• Derive the equation of a circle of given center and radius using the Pythagorean Theorem • Complete the square to find the center and radius of a circle given by an equation. Note: Students should also be able to identify the center and radius when given the equation of a circle and write the equation given a center and radius.
AR.Math.Content.HSG.GPE.A.2	(+)Derive the equation of a parabola given a focus and directrix.
AR.Math.Content.HSG.GPE.A.3	(+) Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.

Expressing Geometric Properties with Equations	**Use coordinates to prove simple geometric theorems algebraically.**
AR.Math.Content.HSG.GPE.B.4	Use coordinates to prove simple geometric theorems algebraically. *For example: Prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).*
AR.Math.Content.HSG.GPE.B.5	• Prove the slope criteria for parallel and perpendicular lines. • Use the slope criteria for parallel and perpendicular lines to solve geometric problems. Note: Examples should include but are not limited to finding the equation of a line parallel or perpendicular to a given line that passes through a given point.
AR.Math.Content.HSG.GPE.B.6	Find the midpoint between two given points; and find the endpoint of a line segment given the midpoint and one endpoint. Note: An extension of this standard would be to find the point on a directed line segment between two given points that partitions the segment in a given ratio.

AR.Math.Content.HSG.GPE.B.7	Use coordinates to compute perimeters of polygons and areas of triangles and rectangles. Note: Examples should include, but are not limited using the distance formula and area of composite figures.

Geometric Measurement and Dimension	**Explain volume formulas and use them to solve problems.**
AR.Math.Content.HSG.GMD.A.1	Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. *For example: Use dissection arguments, Cavalieri's principle, and informal limit arguments.*
AR.Math.Content.HSG.GMD.A.2	(+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.
AR.Math.Content.HSG.GMD.A.3	• Use volume formulas for cylinders, pyramids, cones, spheres, and to solve problems which may involve composite figures • Compute the effect on volume of changing one or more dimension(s). *For example: How is the volume affected by doubling, tripling, or halving a dimension?*

Geometric Measurement and Dimension	**Visualize relationships between two-dimensional and three-dimensional objects.**
AR.Math.Content.HSG.GMD.B.4	• Identify the shapes of two-dimensional cross-sections of three- dimensional objects • Identify three-dimensional objects generated by rotations of two-dimensional objects.

High School Geometry – Arkansas Mathematics Standards

Modeling with Geometry	**Apply geometric concepts in modeling situations.**
AR.Math.Content.HSG.MG.A.1	Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).*
AR.Math.Content.HSG.MG.A.2	Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).*
AR.Math.Content.HSG.MG.A.3	Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).*

High School Statistics and Probability – Arkansas Mathematics Standards

Interpreting Categorical and Quantitative Data	**Summarize, represent, and interpret data on a single count or measurement variable**
AR.Math.Content.HSS.ID.A.1	Represent data with plots on the real number line (dot plots, histograms, and box plots).
AR.Math.Content.HSS.ID.A.2	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
AR.Math.Content.HSS.ID.A.3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). *For example: Be able to explain the effects of extremes or outliers on the measures of center and spread.*
AR.Math.Content.HSS.ID.A.4	• Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. • Recognize that there are data sets for which such a procedure is not appropriate. • Use calculators and/or spreadsheets to estimate areas under the normal curve. Note: Limit area under the curve to the empirical rule. (68-95-99.7) to estimate the percent of a normal population that falls within 1, 2, or 3 standard deviations of the mean. Also, recognize that normal distributions are only appropriate for unimodal and symmetric shapes.

Interpreting Categorical and Quantitative Data	**Summarize, represent, and interpret data on two categorical and quantitative variables**
AR.Math.Content.HSS.ID.B.5	• Summarize categorical data for two categories in two-way frequency tables. • Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). • Recognize possible associations and trends in the data.
AR.Math.Content.HSS.ID.B.6	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. • Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Note: Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. The focus of Algebra I should be on linear and exponential models while the focus of Algebra II is more on quadratic and exponential models. • Informally assess the fit of a function by plotting and analyzing residuals.

High School Statistics and Probability – Arkansas Mathematics Standards

Interpreting Categorical and Quantitative Data	**Interpret linear models**
AR.Math.Content.HSS.ID.C.7	Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
AR.Math.Content.HSS.ID.C.8	Compute (using technology) and interpret the correlation coefficient of a linear fit.
AR.Math.Content.HSS.ID.C.9	Distinguish between correlation and causation.

Making Inferences and Justifying Conclusions	**Understand and evaluate random processes underlying statistical experiments**
AR.Math.Content.HSS.IC.A.1	Recognize statistics as a process for making inferences about population parameters based on a random sample from that population.
AR.Math.Content.HSS.IC.A.2	Compare theoretical and empirical probabilities using simulations (e.g. such as flipping a coin, rolling a number cube, spinning a spinner, and technology).

Making Inferences and Justifying Conclusions	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies**
AR.Math.Content.HSS.IC.B.3	• Recognize the purposes of and differences among sample surveys, experiments, and observational studies • Explain how randomization relates to sample surveys, experiments, and observational studies
AR.Math.Content.HSS.IC.B.4	• Use data from a sample survey to estimate a population mean or proportion. • Develop a margin of error through the use of simulation models for random sampling.
AR.Math.Content.HSS.IC.B.5	• Use data from a randomized experiment to compare two treatments. • Use simulations to decide if differences between parameters are significant.
AR.Math.Content.HSS.IC.B.6	Read and explain, in context, the validity of data from outside reports by • Identifying the variables as quantitative or categorical. • Describing how the data was collected. • Indicating any potential biases or flaws. • Identifying inferences the author of the report made from sample data. Note: As a strategy, students could collect reports published in the media and ask students to consider the source of the data, the design of the study, and the way the data are analyzed and displayed.

High School Statistics and Probability – Arkansas Mathematics Standards

Conditional Probability and the Rules of Probability	**Understand independence and conditional probability and use them to interpret data**
AR.Math.Content.HSS.CP.A.1	Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").
AR.Math.Content.HSS.CP.A.2	Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.
AR.Math.Content.HSS.CP.A.3	Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.
AR.Math.Content.HSS.CP.A.4	• Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. • Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. o For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. • Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.
AR.Math.Content.HSS.CP.A.5	Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.

Conditional Probability and the Rules of Probability	**Use the rules of probability to compute probabilities of compound events.**
AR.Math.Content.HSS.CP.B.6	Find the conditional probability of A given B.
AR.Math.Content.HSS.CP.B.7	Apply the Addition Rule, P(A or B) = P(A) + P(B) - P(A and B), and interpret the answer in terms of the model.

AR.Math.Content.HSS.CP.B.8	(+) Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model.
AR.Math.Content.HSS.CP.B.9	Use permutations and combinations to compute probabilities of compound events and solve problems.
AR.Math.Content.HSS.CP.B.10	Use visual representations in counting (e.g. combinations, permutations, etc.) including but not limited to: • Venn Diagrams • Tree Diagrams

High School Statistics and Probability – Arkansas Mathematics Standards

Using Probability to Make Decisions	**Calculate expected values and use them to solve problems**
AR.Math.Content.HSS.MD.A.1	(+) Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.
AR.Math.Content.HSS.MD.A.2	• (+) Calculate the expected value of a random variable. • (+)Interpret the expected value of a random variable as the mean of the probability distribution.
AR.Math.Content.HSS.MD.A.3	• (+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated. • (+)Find the expected value. *For example: Find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes.*
AR.Math.Content.HSS.MD.A.4	• (+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically. • (+)Find the expected value. *For example: Find a current data distribution on the number of TV sets per household in the United States, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households?*

High School Statistics and Probability – Arkansas Mathematics Standards

Using Probability to Make Decisions	**Use probability to evaluate outcomes of decisions**
AR.Math.Content.HSS.MD.B.5	(+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values. • Find the expected payoff for a game of chance. *For example: Find the expected winnings from a state lottery ticket or a game at a fast-food restaurant. In a Statistics course* • Evaluate and compare strategies on the basis of expected values. *For example: Compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.*

AR.Math.Content.HSS.MD.B.6	(+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).
AR.Math.Content.HSS.MD.B.7	(+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).